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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/699,894	10/30/2000	Mukund Padmanabhan	YOR20000388US1	7224

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FERENCE & ASSOCIATES  
129 Oakhurst Road  
Pittsburgh, PA 15215

EXAMINER

NOLAN, DANIEL A

ART UNIT	PAPER NUMBER
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2655

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/699,894

Applicant(s)

PADMANABHAN ET AL.

Examiner

Daniel A. Nolan

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

(Note that as of October 1, 2002 a new **Art Unit 2655** was established that includes this application, and that this new AU number should be used in all future correspondence.)

### ***Information Disclosure Statement***

1. The listing of references in the specification (lines 5 & 6 page 2, line 6 page 8, line 1 page 9, line 2 page 11, line 11 page 14, etc.), is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description:

- Items 120 and 134 (in figure 2) are not explained.

3. The drawings are objected to because the (docket) notations at the top of each page will have to be removed when formal drawings are submitted.

4. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The disclosure is objected to because of the following informalities:
- "Gaussian" should be capitalized (line 17 page 6; lines 2, 8 & 15 page 15, line 8 page 18, etc.)
  - "Hessian" should be capitalized (line 4 page 16).

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

#### **Watanabe et al**

7. Claims 1, 4-7 and 10-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe et al (U.S. Patent 5,754,681 A).

8. Regarding claims 1, 7 and 13; the *Signal Pattern Recognition Apparatus, Parameter Training Controller for Training Feature Conversion Parameters and Discriminant Functions of Watanabe et al* reads on the process of providing pattern recognition as follows:

- *Watanabe et al* (200 in figure 1) reads on the feature of *an input interface for inputting a pattern;*
- *Watanabe et al* (1 in figure 2) reads on the feature of *transforming the input pattern to provide a set of at least one feature for a classifier;*
- *Watanabe et al* (column 18 lines 9-24) reads on the feature of *minimizing the probability of subsequent misclassification of at least one feature in the classifier;*
- *Watanabe et al* (column 18 lines 59-68) reads on the feature of *developing an objective function; and*
- *Watanabe et al* (column 19 lines 8-9) reads on the feature of *optimizing the objective function through gradient descent.*

9. Regarding claims 4 and 10; the claims are set forth with the same limits as claims 1 and 7, respectively. *Watanabe et al* (column 21 line 8) reads on the feature of *querying whether the optimized objective function converges.*

10. Regarding claims 5 and 11; the claims are set forth with the same limits as claims 4 and 10, respectively. *Watanabe et al* (column 24 line 22) reads on the feature of *repeating an optimizing step if the optimized objective function does not converge.*

11. Regarding claims 6 and 12; the claims are set forth with the same limits as claims 4 and 10, respectively. Watanabe et al (column 1, lines 10-15) reads on the feature that *pattern recognition is speech recognition*.

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Watanabe et al & Chittineni et al**

14. Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al and further in view of Chittineni et al ("On the Maximization of Divergence in Pattern Recognition – Correspondence", IEEE Transactions on Information Theory, September 1976).

15. Regarding claims 2 and 8; the claims are set forth with the same limits as claims 1 and 7, respectively. Where Watanabe et al does not specifically mention *maximizing average pair divergences*, Chittineni et al (page 59 lines 6-7) reads on the feature of *maximizing an average pairwise divergence*, which would have made it obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Chittineni et al to the device/method of Watanabe et al so as to reduce error probability.

**Watanabe et al & Guorong et al**

16. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al and further in view of Guorong et al ("Bhattacharyya Distance Feature Selection", Proceedings of the 13th International Conference on Pattern Recognition, August 1996).

17. Regarding claims 3 and 9; the claims are set forth with the same limits as claims 1 and 7, respectively. Where Watanabe et al does not specifically mention the *Bhattacharyya* method, Guorong et al (last 5 lines, page 195) reads on the feature of

*minimizing a union Bhattacharyya bound*, which would have made it obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Guorong et al to the device/method of Watanabe et al so as to select the most optimum possibility.

### **Conclusion**

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Wang et al ("Classification Of Discrete Data With Feature Space Transformation", IEEE Transactions on Automatic Control, June 1979) uses discriminant analysis to avoid classification anomalies.
- Komori et al (U.S. Patent 6,108,628 A) is a speech recognition method and apparatus using coarse and fine output probabilities utilizing an unspecified speaker model that employs Bhattacharyya distances.
- Riley et al (U.S. Patent 5,737,723 A) employs Bhattacharyya with distances to resolve confusable words in speech recognition.
- Platt (U.S. Patent 6,327,581 B1) examines pairwise divergence when building a support vector machine classifier.
- Katz et al (U.S. Patent 5,263,097 A) considers pair-wise divergence of normalized features in classification.



19. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Daniel A. Nolan at telephone (703) 305-1368 whose normal business hours are Mon, Tue, Thu & Fri, from 7 AM to 5 PM.

If attempts to contact the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To, can be reached at (703) 305-4827.

The fax phone number for Technology Center 2600 is (703) 872-9314. Label informal and draft communications as "DRAFT" or "PROPOSED", & designate formal communications as "EXPEDITED PROCEDURE".

Formal response to this action may be faxed according to the above instructions,

or mailed to: Commissioner of Patents and Trademarks  
Washington, D.C. 20231

or hand-delivered to: Crystal Park 2,  
2121 Crystal Drive, Arlington, VA,  
Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Technology Center 2600 Customer Service Office at telephone number (703) 306-0377.

Daniel A. Nolan  
Examiner  
Art Unit 2655

DAN/d

January 10, 2003

A handwritten signature in black ink, appearing to read 'Daniel A. Nolan', with a large, stylized initial 'D' and 'N'.

**DANIEL NOLAN  
PATENT EXAMINER**